PROTOCOL FOR TAKING GRAPEVINE CANOPY IMAGES IN THE VINEYARD

With the aim of characterizing the main elements of a grapevine canopy the following steps/hints for image acquisition have to be followed. The following steps give a clear instruction of the proper way to acquire the images. Examples of correctly and incorrectly taken images are also included.

1. The vines should be photographed under similar natural light conditions (within one hour approx.), and with diffuse light preferably. A standard digital reflex camera of good resolution 10MP-14MP with a flash light, in order to avoid shadows in the canopy, should be used. The camera should be mounted on a tripod set vertical to the canopy 2 meters away from row axis and at 1.00 m above the ground.

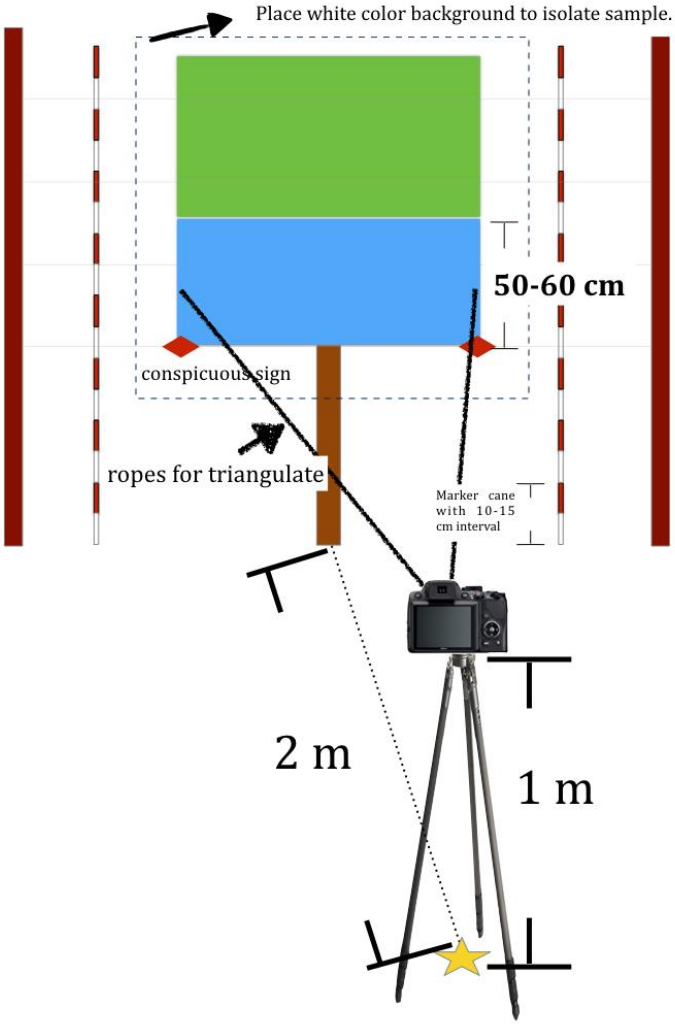

Figure 1. Correct positioning of the camera and additional features for proper image acquisition.

2. Put conspicuous signs (orange or red strips) in the two ends (both cordons) of the canopy. Alternatively, two woody or plastic canes can also be used instead of the plastic strips. (Figure 1). Images should be taken from the same point at the same distance. For this, it is advisable that you make some sort of "triangle" with two ropes or strips so that the position of the camera (with a tripod) does not change from the first date until the end of photo shooting period (Figure 1). Figure 2 shows two examples, of a correctly (Figure 2a) and incorrectly (Figure 2b) delimitation of the canopy ends.

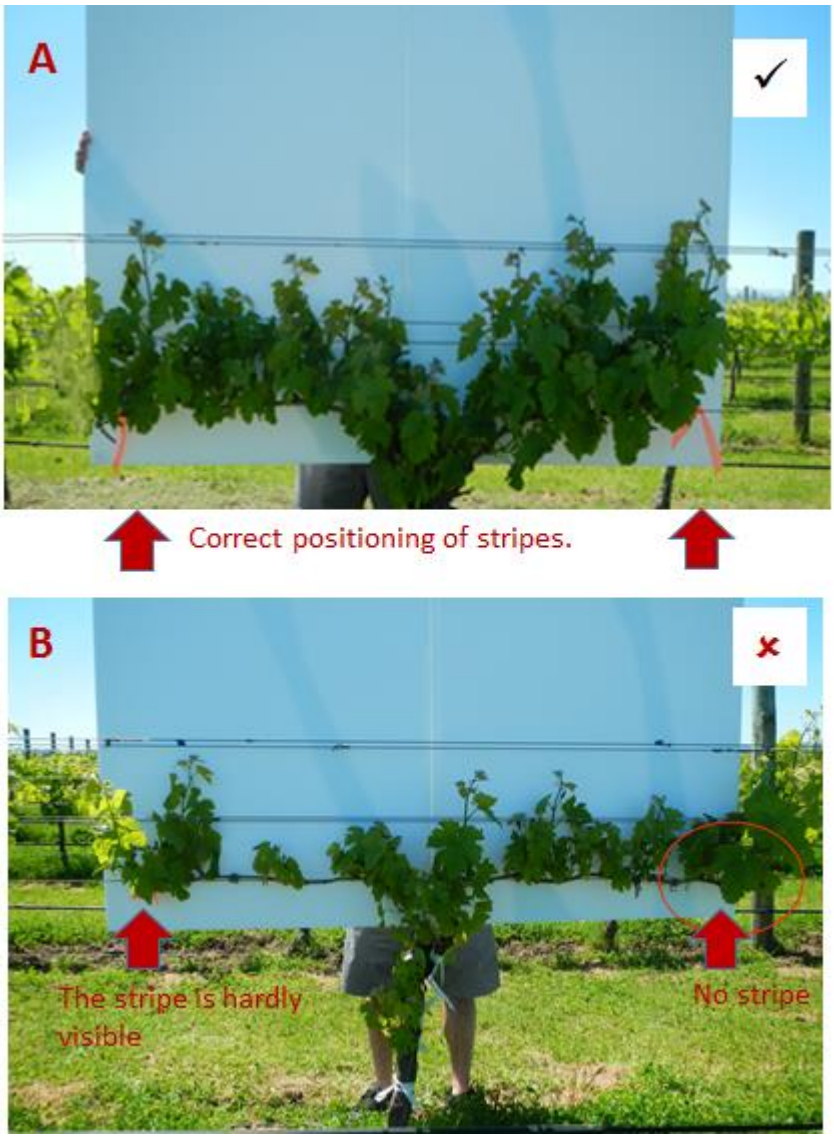

Figure 2. (a) Correct image with both plastic stripes visible at the two ends of the grapevine (b) Wrong image. Only one stripe is placed and hardly visible

3. In order to avoid the canopies of adjacent vines being also photographed, thus interfering with the image of the vine of interest, a white cloth, paper, screen, background should be placed behind the canopy of the vine to be photographed (Figure 3). Field of view would be constant during the season. All images should have the same number of pixels and field of view, and comparison among them for temporal series would be much easier. Figure 3 shows examples of correct and incorrect placement of the background.

Figure 3. (a) Correct positioning of the white background, as it fully covers the whole grapevine, including the two plastic stripes. (b) Wrong positioning of the background as it does not fully cover the vine, either the plastic stripe at the end.

4. Finally, use the camera's automatic mode to obtain the optimal images for analysis in any weather condition.
5. Do not edit the pictures with Photoshop or similar software, just rename the pictures indicating the grape variety, grapevine number, treatment and date of acquisition.

Figure 4 illustrates an incorrectly acquired image. The shadows distribution is very deficient, caused by an inadequate lighting. Additionally, the image was not taken perpendicularly to the canopy.

Figure 4. Incorrect image. Shooting was not carried out perpendicular to the canopy, and lighting was inadequate, leading to extensive shadowing.